Communicable Disease BULLETIN
The New Hampshire Division of Public Health Services November 2008

Automated Real-Time Disease Surveillance System using Emergency Department Visits for the Timely Detection of Public Health Threats in New Hampshire

David Swenson, M.E., AHEDD Project Manager

The Automated Hospital Emergency Department Data (AHEDD) system is a real-time public health surveillance system used to identify communicable disease and other health threats statewide. AHEDD is maintained by the New Hampshire Division of Public Health Services (DPHS), Communicable Disease Surveillance Section. After 9/11, emergency department surveillance was established using a manual reporting system, which required hospital Infection Control Practitioners to hand track and email daily emergency department activity to DPHS for review and detection of potential outbreaks or other public health events. This resource intensive and less timely system was replaced in August 2006 by AHEDD. AHEDD was initially implemented with four pilot hospitals and has increased to 11, which represents approximately 55% of NH's total hospital volume. The system collects data automatically from a real-time data feed provided by participating hospitals and captures emergency department visit information, including patient demographics, chief complaint, and ICD-9 codes for each patient visit. Specific legislative authority authorizes NH DHHS to collect this information for the purposes of disease surveillance. In 2008, hospital participation was mandated under the communicable disease administrative rules, HeP-300.

AHEDD system features include detection charts, counts, and alerts with the capability to drill-down to encounter details for:

1. Medium to large disease syndrome clusters,
2. Single or small clusters of infectious diseases detected using chief complaint data mining tools;
3. Automated confirmed disease reporting from diagnosis code updates,
4. Daily, weekly, and monthly activity reports, and
5. Remote access to system surveillance tools for hospital partners.

AHEDD has detected:

1. Medium to large hospital fever/flu syndrome encounter clusters attributed to influenza vaccine clinics;
2. A medium injury encounter cluster attributed to a mass casualty exercise in a NH town;
3. A small hospital carbon monoxide cluster attributed to a high school building exposure;
4. Varicella, meningitis, and hepatitis encounters identified from chief complaint text that led to more detailed investigations by DPHS investigators and hospital ICPs; and
5. Lyme disease, hepatitis, Varicella, pneumonia, food-borne illness, and HIV reportable diseases identified from ICD-9 codes.

Future goals for AHEDD include adding the remaining hospitals to achieve statewide surveillance and integrating GIS mapping with adhoc web reporting. AHEDD has proven to be more timely, consistent, and detailed than the old manual system. The tools within AHEDD have contributed to earlier detection and have helped to protect the citizens of the State of NH. For more information about AHEDD please contact the AHEDD Project Manager, David Swenson at 603-271-7366 or dswenson@dhhs.state.nh.us.

Changes in HIV/AIDS Surveillance and Reporting

In 2008, NH DHHS updated the communicable disease-related administrative rules, HeP-300, which among other changes, included new requirements for Human Immunodeficiency Virus (HIV). Effective June 3, 2008, healthcare providers are now required to report perinatal HIV exposure in newborns and infants. Additionally, HIV laboratory reporting has been expanded to specifically mandate reporting of all tests indicative of HIV infection, including antibody, antigen PCR-based, CD4+ counts, and viral loads. This requirement includes reporting of viral load tests even when no virus is detectable. For more information or to report a case, please contact Heather Barto, HIV/AIDS Surveillance Coordinator at 603-271-3932.

FOODBORNE OUTBREAK SURVEILLANCE AND THE USE OF MOLECULAR METHODS:

Importance of Specimen Collection and Submission to the NH Public Health Laboratories

Foodborne illness is a significant cause of morbidity and mortality in the United States. The U.S. Centers for Disease Control and Prevention (CDC) estimates that 76 million cases of foodborne illness occur each year in the United States leading to 325,000 hospitalizations and 5,000 deaths. In New Hampshire, excluding sexually transmitted infections, foodborne illnesses account for more than 50% of our reportable disease case reports.

The epidemiology of foodborne outbreaks in the U.S. has seen a shift from the typical easier-to-detect point source outbreaks to large, widespread outbreaks. Because the food supply in the United States is largely centrally processed and food items are distributed across the country, recognition of foodborne outbreaks can be difficult if only a few people become ill in each area where a food may be distributed (ie. one or two cases in each state). Molecular techniques, which can indicate relatedness between specific strains of bacteria found in patients across the state and country, significantly enhance recognition of outbreaks caused by a common food item.

In recent years, there have been several large multistate outbreaks identified in the U.S. by State Public Health Laboratories using molecular techniques. Many of these outbreaks received national attention including three tomato-associated outbreaks of *Salmonella* affecting hundreds of people across the northeast in 2004, an outbreak of *E. coli* O157:H7 associated with spinach in 2006, and an outbreak of *Salmonella* associated with peanut butter in 2007.

Use of molecular techniques relies on specimen submission by patients and subsequent delivery of the specimen to the NH Public Health Laboratories (NH PHL). Once at the NH PHL, all isolates of *Salmonella, Shigella, Listeria, Campylobacter,* and Shiga toxin-producing *E. coli* (STEC) undergo a molecular technique called pulsed-field gel electrophoresis (PFGE). The PFGE process produces a DNA fingerprint of the isolate provided by each patient. These fingerprints can then be compared across patients; if some are found to have the same fingerprint, this may indicate the patients became infected from a common source. The fingerprints from NH patients are uploaded to a national database called PulseNet, maintained by the Centers for Disease Control and Prevention. PulseNet scientists are then able to compare fingerprints from across states to look for patients with the same fingerprints.

Between 2005 and 2006, NH PHL identified 61 *Salmonella* clusters, ten *E. coli* O157:H7 clusters, two *Listeria monocytogenes* clusters, and two *Shigella* clusters. Once identified, PFGE clusters are investigated to determine if the cluster is a true foodborne outbreak. After epidemiologic investigation, six (18%) of the 33 clusters in 2005 were determined to be common source foodborne outbreaks. In 2006, a common food source was identified in four (10%) of 42 clusters.

PFGE analysis has proved particularly useful in distinguishing between sporadic cases and outbreak-related cases of common diseases. For example, approximately 40 to 64 cases of *Salmonella* serotype Enteritidis and *Salmonella* serotype Typhimurium, the two most common types of *Salmonella* in the U.S., are reported in NH each year. These serotypes represent approximately 30% of all reported cases of *Salmonella*. In 2005, a total of seven *S.* Typhimurium clusters and eight *S.* Enteritidis clusters were identified in NH. Of those 15, only four were found to be common source outbreaks and involved 26 patients. Because these particular types of *Salmonella* are common, PFGE allows for the efficient use of limited public health resources by helping to distinguish between sporadic cases and true outbreaks.

Table 1. Number of PFGE Foodborne Illness Clusters* Identified in NH, NH Clusters and Multistate Clusters involving NH Residents, 2003-2006

IDENTIFIED CLUSTERS	2003	2004	2005	2006	TOTAL
PFGE Clusters in NH	20	14	17	17	68
Multistate Clusters involving NH Residents	13	18	16	25	72
TOTAL	33	32	33	42	140

* A cluster is defined as 2 or more isolates with indistinguishable PFGE fingerprints within a 30 day period.

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The major limitation of a molecular outbreak surveillance system such as PulseNet is that it is entirely reliant on a physician's decision to collect the specimen and the subsequent delivery of the isolate from the local clinical microbiology laboratory to the NH PHL. For clinicians, diarrhea is a common clinical presentation and is often treated empirically or symptomatically. According to the Infectious Diseases Society of America, any patient with community-acquired diarrhea lasting more than one day, especially if accompanied by fever, bloody stool, systemic illness, recent use of antibiotics, day-care center attendance, hospitalization, or dehydration, should have a stool sample cultured for the presence of *Salmonella, Shigella,* and *Campylobacter* species and, in certain circumstances, *E. coli* O157:H7 and *Clostridium difficile* [1]. Once these pathogens are identified in the patient's stool, the isolate should then be forwarded to the NH PHL. Increased specimen collection and submission would improve outbreak detection here in NH and across the U.S.

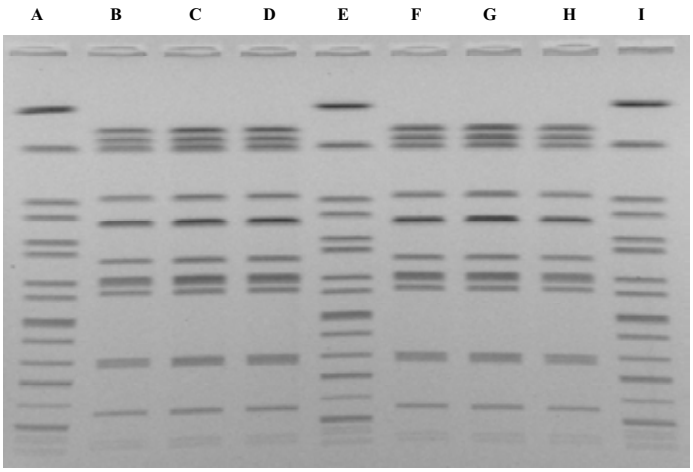

Figure 1. Pulsed-Field Gel Electrophoresis patterns of the six New Hampshire patient isolates from the national *Salmonella* Saintpaul outbreak associated with peppers in 2008. Outbreak isolates B, C, D, F, G, and H are indistinguishable. Courtesy of the NH Public Health Laboratories

References:

1. Guerrant RL, Van Gilder T, Steiner TS, et al. Practice guidelines for the management of infectious diarrhea. Clin Infect Dis 2001; 32:331–51.

NEW HAMPSHIRE HEALTH ALERT NETWORK (NH HAN)

The NH HAN is a 24/7/365 comprehensive public health emergency notification and alerting program. As a physician or infection control practitioner, you are likely included in our HAN. To ensure that public health professionals and key response partners have relevant and timely access to information, it's important to keep your user contact information up to date in the Communicator!NXT, New Hampshire's primary alerting and notification system. Remember – phone numbers and e-mail addresses change, as do positions and job responsibilities. Please take a few minutes to be sure that we have the most current contact information for you in the Communicator!NXT at https://alert.nh.gov. If you've forgotten your password or haven't been in the system recently, feel free to contact Denise Krol, NH HAN Coordinator, to reset your Password and PIN at 603-271-4596 or Denise.Krol@dhhs.state.nh.us

LYME DISEASE CONTINUES TO INCREASE IN NH

Lyme disease was first discovered in the U.S. in the late 1970s and has been reportable to the NH DHHS since 1990. Over the past several years, there has been an increase in the incidence of Lyme disease cases reported from New England states. During 2007, 901 confirmed Lyme disease cases, 69 cases per 100,000 persons, were reported in NH residents; this is an increase of 46% from 2006 during which 617 cases, or 47 cases per 100,000 persons, were reported. Most people are infected with Lyme disease between May and August, after being bitten by immature (nymph) deer ticks. Lyme disease can be prevented through the use of insect repellants, wearing protective clothing, and frequent tick checks and tick removal. Please visit our website for additional information and surveillance data including maps and county-specific rates of infection.
http://www.dhhs.nh.gov/DHHS/CDCS/lymedisease.htm

COMMUNICABLE DISEASE ANNUAL REPORT 2003-2005 PUBLISHED TO WEBSITE

The Annual Communicable Disease Surveillance Report provides useful information on reported communicable diseases in New Hampshire for health care providers, educators and other interested persons. Please visit the NH DHHS website to view the current annual report, which includes data through 2005. Disease summaries provide incidence rates, county maps, epidemiological information, and risk factors for selected diseases. In addition to disease specific reports, special reports provide information on arboviral disease surveillance, tuberculosis, foodborne illness surveillance, respiratory disease surveillance and an overview of a reported case of congenital rubella syndrome.
http://www.dhhs.nh.gov/DHHS/CDCS/LIBRARY/Data-Statistical+Report/annual-report.htm

New Hampshire Department of Health and Human Services
Communicable Disease Surveillance Section

REPORTABLE COMMUNICABLE DISEASES IN NEW HAMPSHIRE, 1998 - 2008

DISEASE / CONDITION	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008 YTD
Acquired Immune Deficiency Syndrome (AIDS)	42	46	31	34	63	39	38	19	34	31	9
Anaplasmosis¥	0	1	0	0	1	1	1	1	0	3	9
Anthrax	0	0	0	0	0	0	0	0	0	0	0
Babesiosis	*nr*	*nr*	*nr*	*nr*	*nr*	*nr*	*nr*	2	3	3	9
Botulism	0	1	0	0	0	1	1	1	0	0	0
Brucellosis	0	0	1	0	0	0	0	1	0	0	0
Campylobacteriosis	170	176	153	154	175	189	209	184	163	142	133
Chlamydial infection	962	981	1134	1396	1554	1611	1752	1831	2013	2116	1743
Cholera	0	0	0	1	0	0	0	0	0	0	0
Coccidioidomycosis	0	0	2	3	0	0	0	0	0	2	1
Creutzfeldt-Jakob Disease (CJD)	*nr*	*nr*	*nr*	*nr*	*nr*	*nr*	*nr*	0	0	1	0
Cryptosporidiosis	17	20	25	17	31	26	30	40	47	47	52
Cyclospora infection	0	0	0	0	1	0	0	0	0	0	1
Diphtheria	0	0	0	0	0	0	0	0	0	0	0
Ehrlichiosis*	0	1	0	0	3	1	1	2	3	1	8
Encephalitis, arboviral Eastern Equine (EEE)	0	0	0	0	0	0	0	7	0	3	0
Encephalitis, arboviral West Nile Virus (WNV)	0	0	0	0	0	3	0	0	0	0	0
Escherichia coli infection, Shiga toxin-producing ¶	47	37	45	38	35	24	29	19	29	35	30
Giardiasis§	79	67	53	39	46	44	48	66	26	33	132
Gonorrhea	90	115	111	179	120	123	134	179	177	139	85
Haemophilus influenzae , invasive disease	9	20	13	8	13	19	22	9	17	17	9
Hantavirus Pulmonary Syndrome	0	0	0	0	0	0	0	0	0	0	0
Hemolytic Uremic Syndrome (HUS)	0	0	3	0	2	0	1	1	0	1	1
Hepatitis A	17	19	18	18	12	19	27	82	22	12	12
Hepatitis B, Acute	22	18	18	17	25	24	44	30	11	5	6
Human Immunodeficiency Virus (HIV)	29	26	26	22	25	33	39	24	32	35	20
Invasive Group A Streptococcus (GAS)	9	16	16	19	38	33	22	18	35	27	26
Invasive Group B Streptococcus (GBS)	7	17	8	12	20	13	17	32	36	37	38
Legionellosis	7	10	4	12	8	9	15	8	15	9	24
Leprosy, Hansen's disease	0	0	0	0	0	0	1	0	1	1	0
Listeriosis	3	5	4	4	4	4	4	9	7	4	6
Lyme disease	45	55	95	129	263	190	229	270	617	901	1193
Malaria	5	2	1	2	8	7	5	6	10	9	4
Measles	0	1	3	0	0	1	0	1	1	0	0
Mumps	0	2	0	0	5	2	1	1	5	2	3
Neisseria meningitidis, invasive disease	13	13	12	15	14	12	7	12	4	3	4
Pertussis	148	137	131	31	80	120	134	186	227	79	30
Plague	0	0	0	0	0	0	0	0	0	0	0
Polio	0	0	0	0	0	0	0	0	0	0	0
Psittacosis	1	0	0	0	0	1	0	0	1	0	0
Rabies in Humans or Animals +	83	47	23	23	49	29	32	11	50	53	44
Rocky Mountain Spotted Fever	0	0	0	0	0	0	0	1	1	1	1
Rubella, including Congenital Rubella Syndrome	0	0	2	0	0	0	0	3	0	0	0
Salmonellosis	184	148	143	168	142	152	145	176	225	172	120
Shigellosis	17	20	6	7	15	10	10	19	11	7	3
Streptococcus pneumoniae, invasive disease	*nr*	*nr*	*nr*	*nr*	*nr*	*nr*	*nr*	87	67	94	77
Syphilis ‡	15	12	17	17	26	34	26	33	35	52	35
Tetanus	0	0	0	0	0	0	0	0	0	1	0
Toxic-Shock Syndrome (TSS)	0	2	1	1	0	2	4	2	2	1	2
Trichinosis	0	0	0	0	0	1	0	0	0	0	0
Tuberculosis disease	14	19	22	20	19	15	24	5	17	11	17
Tularemia	*nr*	*nr*	*nr*	*nr*	*nr*	*nr*	*nr*	0	0	1	0
Typhoid fever	1	0	0	2	0	4	0	0	0	1	2
Typhus	0	0	0	0	0	0	0	0	0	0	0
Vancomycin Resistant Enterococci (VRE)	35	37	56	66	92	105	147	182	178	242	206
Vancomycin Resistant *Staphylococcus aureus* (VRSA)	0	0	0	0	0	0	0	0	0	0	0
Varicella (Chickenpox)	*nr*	*nr*	*nr*	*nr*	*nr*	*nr*	*nr*	337	419	374	216
Vibrio infection	*nr*	*nr*	*nr*	*nr*	*nr*	*nr*	*nr*	2	1	1	1
Yersiniosis	3	6	6	5	4	2	2	3	4	3	3

YTD= Total number of reported cases through October 31st, 2008. Data for 2008 is considered provisional and may change after yearly review of data.

nr =Not Reportable

¥ Includes *Anaplasma phagocytophilum,* and all cases prior to 2008 reported as human granulocytic ehrlichiosis (*Ehrlichia phagocytophila*)

* Includes *Ehrlichia chaffeensis* , *Ehrlichia ewingii* , and undetermined *Ehrlichia /Anaplasma* species

¶ Includes O157:H7

+ One case of human rabies reported in 1996

§ Between August 1997 and December 2007, only cases in persons 5 years of age and younger are reported. All ages are reported for years outside this timeframe.

‡ Includes all stages of Syphilis infection

Note: All the data in this report are based upon information provided to the New Hampshire Department of Health and Human Services under specific legislative authority. The numbers reported may represent an underestimate of the true absolute number and incidence rate of cases in the state. Any release of personal identifying information is conditioned upon such information remaining confidential. The unauthorized disclosure of any confidential medical or scientific data is a misdemeanor under New Hampshire law. The department is not responsible for any duplication or misrepresentation of surveillance data released in this report. Case counts by year are based on morbidity date, which is the date closest to onset of illness and may represent date of onset, date of diagnosis, or date of report, whichever is earliest. Case counts may not exactly match data published yearly by the Centers for Disease Control and Prevention. Data are complete as of November 7th, 2008. Data prepared by Elizabeth R. Daly, MPH.

NH DHHS VIRAL HEPATITIS PROGRAM

The Viral Hepatitis Program works to plan, develop, coordinate and evaluate public health education, health promotion and disease prevention programs for viral hepatitis. The primary goal is to protect the public's health by preventing and controlling viral hepatitis infection. The program works in collaboration with community health agencies, other DHHS programs such as the STD/HIV Program, the Immunization Program, and the Alcohol and Drug Prevention and Recovery Program. Other partners include government agencies such as the Department of Correction, the Nashua and Manchester Health Departments and a variety of other medical and nursing professionals.

Hepatitis C - Testing, Counseling, Referral

The state funds twenty-four walk-in STD/HIV clinic sites throughout NH. These sites offer a variety of hepatitis services. All clients disclosing an IDU risk are offered HCV testing. Clinics usually have an agreement with a Community Health Center to provide an appropriate referral and care for individuals who test positive for hepatitis. All contractors working with the IDU population disseminate HIV, HBV, and HCV messages to their clients.

Perinatal Hepatitis B Program

The NH Perinatal Hepatitis Program tracks every hepatitis B-positive pregnant woman reported to our department. The primary program goals are to identify all hepatitis B-positive pregnant women through routine screenings by pre-natal providers and ensure that all infants born to hepatitis B-positive mothers receive hepatitis B vaccine and hepatitis B immune globulin at birth, complete the 3-dose hepatitis B vaccine series and have post-vaccination blood testing to show that they are protected. For inquiries contact Tricia Ingraham, Viral Hepatitis Coordinator 271-5720.

Hepatitis B Vaccine Initiative

In November of 2007, CDC awarded a 1-year grant to the NH Immunization Program to purchase adult hepatitis B vaccine. In collaboration with the Viral Hepatitis Program and STD/HIV Section the funds are being used to provide hepatitis B vaccination in public care settings serving high-risk adults such as STD clinics, Planned Parenthood Sites, County Correctional Facilities, NH Department of Corrections, and the Manchester Refugee/Immigrant Health Program. For inquires contact Karen Donoghue, Adult Immunization Coordinator at 271-5715.

NEW HIV/Hepatitis Hotline 1-800-752-2437

Resource for information, referrals to public health clinics, and supportive telephone counseling for HIV and Hepatitis. The hotline is staffed by public health program staff. All calls are anonymous and confidential. Hotline hours are from 8:30am to 4:30pm, Monday through Friday.

UPDATES TO THE NH DHHS REPORTABLE DISEASE LIST

In 2008, NH DHHS updated the communicable disease-related administrative rules, HeP-300. Additions to the list of reportable diseases include Anaplasmosis (previously reportable under human granulocytic ehrlichiosis), perinatal HIV exposures, and expanding vibriosis reporting to include all *Vibrio* species. New reporting form and posters have been produced to reflect these changes. Additionally, reporting emergency department visit information electronically in real-time to NH DHHS was mandated. Several changes were made to the restriction and control measures section, including removal of the requirement for consecutive negative stools for healthcare workers with salmonellosis. Instead, HCW with gastrointestinal illness (including salmonellosis) are restricted from direct care until asymptomatic for 48 hours. To view the updated administrative rules, please visit:
http://www.gencourt.state.nh.us/rules/he-p300.html

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LIST OF REPORTABLE DISEASES IN NEW HAMPSHIRE

Diseases with an asterisk should be reported within 24 hours (all others within 72 hours)

Acquired Immune Deficiency Syndrome (AIDS)
Anaplasmosis [*Anaplasma Phagocytophilum*]
Anthrax [*Bacillus anthracis*]*
Arboviral infection, including EEE & WNV*
Babesiosis [*Babesia microti*]
Botulism [*Clostridium botulinum*]*
Brucellosis [*Brucella abortus*]*
Campylobacteriosis [*Campylobacter* species]
Chlamydial infection [*Chlamydia trachomatis*]
Cholera [*Vibrio cholerae*]*
Coccidioidomycosis [*Coccidioides immitis*]
Creutzfeldt-Jakob Disease*
Cryptosporidiosis [*Cryptosporidium parvum*]
Cyclospora infection [*Cyclospora cayetanensis*]
Diphtheria [*Corynebacterium diphtheriae*]*
Ehrlichiosis [*Ehrlichia* species]
Escherichia coli O157 infection and other shiga toxin producing *E. coli*
Giardiasis [*Giardia lamblia*]
Gonorrhea [*Neisseria gonorrhoeae*]
Haemophilus influenzae, invasive disease, sterile site*
Hantavirus Pulmonary Syndrome [Hantavirus]*
Hemolytic Uremic Syndrome (HUS)
Hepatitis, viral: A*, B, E, G
Hepatitis, viral: positive B surface antigen in a pregnant woman
Human Immunodeficiency Virus (HIV), including perinatal exposure
Human Immunodeficiency Virus-related CD4+ counts and all viral loads
Legionellosis [*Legionella pneumophila*]
Leprosy, Hansen's disease [*Mycobacterium leprae*]
Listeriosis [*Listeria monocytegenes*]
Lyme disease [*Borrelia burgdorferi*]
Malaria [*Plasmodium* species]
Measles [Rubeola]*
Mumps*
Neisseria meningitidis, invasive disease, sterile site*
Pertussis [*Bordetella pertussis*]*
Plague [*Yersinia pestis*]*
Pneumococcal disease, invasive [*Streptococcus pneumoniae*]
Pneumocystis pneumonia [*Pneumocystis jiroveci* formerly *carinii*]
Poliomyelitis [Polio]*
Psittacosis [*Chlamydophilia psittaci*]*
Rabies in humans or animals*
Rocky Mountain Spotted Fever [*Rickettsia rickettsii*]
Rubella, including Congenital Rubella Syndrome*
Salmonellosis [*Salmonella* species] (report *S.* Typhi* within 24 hours)
Shigellosis [*Shigella* species]
Streptococcus Group A/B, invasive disease [*S. pyogenes/agalactiae*]
Syphilis, including Congenital Syphilis Syndrome [*Treponema pallidum*]
Tetanus [*Clostridium tetani*]
Toxic-Shock Syndrome (TSS) [streptococcal or staphylococcal]
Trichinosis [*Trichinella spiralis*]
Tuberculosis disease [*Mycobacterium tuberculosis*]*
Tuberculosis infection, latent
Tularemia [*Francisella tularensis*]*
Typhoid fever [*Salmonella* Typhi]*
Typhus [*Rickettsia prowazekii*]*
Varicella*
Vibriosis [any *Vibrio* species]*
Vancomycin Resistant Enterococci (VRE)
Vancomycin Resistant *Staphylococcus aureus* (VRSA)*
Yersiniosis [*Yersinia enterocolitica*]

ANY SUSPECT OUTBREAK, CLUSTER OF ILLNESS, OR UNUSUAL OCCURRENCE OF DISEASE THAT MAY POSE A THREAT TO THE PUBLIC'S HEALTH MUST BE REPORTED WITHIN 24 HOURS OF RECOGNITION*